

CLAIMS

1. A method of operating a time-of-flight measurement system comprising a first part (10) and a second part (12), both said parts having
5 circuitry (14, 18, 22 and 26, 30, 32) in the propagation path of signals transmitted by, and received by, the parts, the circuitry introducing time delays in the propagation path, at least one of said first and second parts (10, 12) including means for determining the time-of-flight of the signals between the first and second parts, the method comprising calibrating the system by
10 positioning the first and second parts (10, 12) within a known distance of each other, measuring the time-of-flight when the first and second parts are so positioned, determining an error in the measured time-of-flight due to the propagation time delays in the circuitry by deriving the difference between the measured time-of-flight and a theoretical time-of-flight over the known distance
15 and using the error for adjusting a subsequent time-of-flight measurement.
2. A method as claimed in claim 1, characterised by repeating the calibration a plurality of times and determining a mean error.
- 20 3. A method as claimed in claim 1 or 2, characterised in that the second part is at a substantially known distance relative to the first part when calibrating the system.
4. A method of operating a time-of-flight measurement system as
25 claimed in claim 1, 2 or 3, wherein the time-of-flight measurement system is one of: a keyless entry system in which the first part (10) is fixed and the second part (12) is portable; a tracking system in which the first part (10) is adapted to function as a range determining part and the second part (12) is adapted to be carried by an object to be tracked; a vehicle security system
30 comprising lockable security means responsive to locally generated signals and in which the first part (10) is adapted to be mounted in a vehicle and the second part (12) is adapted to be carried by a vehicle user.

5. A system for performing a time-of-flight measurement, comprising a first part (10) and a second part (12), both said parts having signal transmitting and receiving means (14, 22 and 26, 32) for effecting communication with each other, the signal transmitting and receiving means introducing time delays in respective signal propagation paths, and at least one of the first and second parts including means (18, 30) for determining the time-of-flight of the signals between the parts, further comprising means (18, 30) responsive to the first and second parts being within a known distance of each other for calibrating the system, said means including means (18, 30) for measuring the time-of-flight over the known distance, means (18, 30) for determining an error in the measured time-of-flight by deriving the difference between the measured time-of-flight and a theoretical time-of-flight over the known distance and means (18, 30) for using the error for adjusting a subsequent time-of-flight measurement.

6. A system as claimed in claim 5, comprising means (18, 30) for repeating the calibration a plurality of times and determining a mean error.

7. A system as claimed in claim 5 or 6, characterised by means (64) for positioning the second part at a substantially known distance relative to the first part when calibrating the system.

8. A system as claimed in claim 5, 6 or 7, characterised by means (18, 30) for comparing the adjusted measured time-of-flight with a threshold value and, if the result of the comparison is deemed to be acceptable, for producing an actuating signal for operating an external device, and, if it is deemed to be unacceptable, for inhibiting production of an actuating signal.

9. A system as claimed in any of claims 5 to 8, wherein the system is a keyless entry system in which the first part (10) is fixed and the second part (12) is portable.

10. A system as claimed in any of claims 5 to 8, wherein the system is a tracking system in which the first part (10) is adapted to function as a range determining part and the second part (12) is adapted to be carried by an object to be tracked.

11. A system as claimed in any of claims 5 to 8, wherein the system is a vehicle security system comprising lockable security means responsive to locally generated signals and in which the first part (10) is adapted to be mounted in a vehicle and the second part (12) is adapted to be carried by a vehicle user.

12. A system as claimed in claim 11, comprising means (64) for mounting the second part (12) in a vehicle at a substantially known distance relative to the fixed part when measuring the time-of flight.

13. A system as claimed in claim 11 or 12, wherein the means for calibrating the system (18, 30) is responsive to at least one of: a vehicle engine being started; a vehicle engine being turned off; a vehicle's driver door opening; a vehicle's driver door closing; the second part (12) being inserted in a receptacle inside a vehicle; the second part (12) being removed from a receptacle inside a vehicle.

14. A system as claimed in any one of claims 5 to 13, wherein the first part (10) comprises means (60) for storing calibration data corresponding to each of a plurality of second parts (12), and each second part is adapted to transmit an address code.